

MARYLAND HISTORICAL TRUST

MAGI# 0315873715

INVENTORY FORM FOR STATE HISTORIC SITES SURVEY

1 NAME

HISTORIC

Bloede's Dam/Patapsco Dam

AND/OR COMMON

Bloede's Dam

2 LOCATION

STREET & NUMBER

On Patapsco near Avalon, 15 mi. below Balto. on the B&O

CITY, TOWN

CONGRESSIONAL DISTRICT

— VICINITY OF

STATE

COUNTY

Balto. County/Howard County

3 CLASSIFICATION**CATEGORY**☐ DISTRICT☐ BUILDING(S)☒ STRUCTURE☐ SITE☐ OBJECT**OWNERSHIP**☒ PUBLIC☐ PRIVATE☐ BOTH**PUBLIC ACQUISITION**☐ IN PROCESS☐ BEING CONSIDERED**STATUS**☐ OCCUPIED☒ UNOCCUPIED☐ WORK IN PROGRESS**ACCESSIBLE**☐ YES: RESTRICTED☒ YES: UNRESTRICTED☐ NO**PRESENT USE**☐ AGRICULTURE☐ COMMERCIAL☐ EDUCATIONAL☐ ENTERTAINMENT☐ GOVERNMENT☐ INDUSTRIAL☐ MILITARY☐ MUSEUM☐ PARK☐ PRIVATE RESIDENCE☐ RELIGIOUS☐ SCIENTIFIC☐ TRANSPORTATION☒ OTHER: abandoned**4 OWNER OF PROPERTY**

NAME

Maryland Department of Natural Resources

Telephone #:

STREET & NUMBER

Taylor Avenue

CITY, TOWN

Annapolis

— VICINITY OF

STATE, zip code

Maryland 21401

5 LOCATION OF LEGAL DESCRIPTIONCOURTHOUSE,
REGISTRY OF DEEDS, ETC.

Liber #:

Folio #:

STREET & NUMBER

CITY, TOWN

STATE

6 REPRESENTATION IN EXISTING SURVEYS

TITLE

cf. McNamara, p. 48

DATE

☐ FEDERAL ☐ STATE ☐ COUNTY ☐ LOCALDEPOSITORY FOR
SURVEY RECORDS

CITY, TOWN

STATE

7 DESCRIPTION**CONDITION**

☐ EXCELLENT
☐ GOOD
☐ FAIR

☒ DETERIORATED
☐ RUINS
☐ UNEXPOSED

CHECK ONE

☒ UNALTERED
☐ ALTERED

CHECK ONE

☒ ORIGINAL SITE
☐ MOVED DATE _____

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

Bloede's dam is a flat slab reinforced concrete buttress dam of the half-apron type spanning the Patapsco River between Baltimore and Howard counties upstream from Relay, Maryland. It is 220 feet long, 40 feet wide at the base, 26 1/2 feet from normal tail water to the crest. At either end the buttresses and deck are 10 feet above the spillway, which is 168 feet long. The deck is supported by 19 buttresses which taper from a thickness of 24 inches at the base to 16 inches at the top. The shell of the dam varies from a thickness of 18 inches at bottom to 10 inches at the top. Below the half-apron are windows (beneath the overflow). Original equipment included two 34-inch Leffel waterwheels with Woodward governors, turbines running at 240 rpm, direct-connected to Allis-Chalmers 300 kw, 1,000 volt, three-phase 60-cycle alternators. Space was provided for an additional system of this kind.

(Data from Electrical World.)

CONTINUE ON SEPARATE SHEET IF NECESSARY

PERIOD		AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
<input type="checkbox"/> PREHISTORIC	<input type="checkbox"/> ARCHEOLOGY-PREHISTORIC	<input type="checkbox"/> COMMUNITY PLANNING	<input type="checkbox"/> LANDSCAPE ARCHITECTURE	<input type="checkbox"/> RELIGION	
<input type="checkbox"/> 1400-1499	<input type="checkbox"/> ARCHEOLOGY-HISTORIC	<input type="checkbox"/> CONSERVATION	<input type="checkbox"/> LAW	<input type="checkbox"/> SCIENCE	
<input type="checkbox"/> 1500-1599	<input type="checkbox"/> AGRICULTURE	<input type="checkbox"/> ECONOMICS	<input type="checkbox"/> LITERATURE	<input type="checkbox"/> SCULPTURE	
<input type="checkbox"/> 1600-1699	<input type="checkbox"/> ARCHITECTURE	<input type="checkbox"/> EDUCATION	<input type="checkbox"/> MILITARY	<input type="checkbox"/> SOCIAL/HUMANITARIAN	
<input type="checkbox"/> 1700-1799	<input type="checkbox"/> ART	<input checked="" type="checkbox"/> ENGINEERING	<input type="checkbox"/> MUSIC	<input type="checkbox"/> THEATER	
<input type="checkbox"/> 1800-1899	<input type="checkbox"/> COMMERCE	<input type="checkbox"/> EXPLORATION/SETTLEMENT	<input type="checkbox"/> PHILOSOPHY	<input type="checkbox"/> TRANSPORTATION	
<input checked="" type="checkbox"/> 1900-	<input type="checkbox"/> COMMUNICATIONS	<input type="checkbox"/> INDUSTRY	<input type="checkbox"/> POLITICS/GOVERNMENT	<input type="checkbox"/> OTHER (SPECIFY)	
		<input type="checkbox"/> INVENTION			

SPECIFIC DATES 1906

BUILDER/ARCHITECT Amburson Hydraulic Constr.Co.

STATEMENT OF SIGNIFICANCE

Bloede's Dam, built in 1906 by the Patapsco Electric and Manufacturing Co. of Ellicott City¹ and named for the company's president, Victor G. Bloede, represents a milestone in construction technology. Not only was it among the earliest reinforced concrete dams built in the United States², it was the first to take advantage of the technique to house electricity-generating machinery in its hollow interior. This solution was the only one which would satisfy the requirements of the available site (the entire width of the river was needed for the overflow wier) and the financial abilities of the company.

The dam was designed and built by the Amburson Hydraulic Construction Company of Boston, with H. von Schon of Detroit consulting hydraulic engineer and Messrs. Newton and Painter of Baltimore as electrical engineers. Bloede's dam was also believed to be of the minimum height required for such an operation, and all subsequent like endeavors were apparently larger.

The plant was built to replace the one then operating at Gray's Mill, a plant with a 680 hp capacity (380 hp were water power), which was used as a substation after Bloede's dam began its operations.

Bloede's dam produced electricity for years. The machinery was removed in

The superstructures were destroyed in Hurricane Agnes (1972).

Ultimately part of Baltimore Gas and Electric.

²Reinforced concrete dams were introduced to the Eastern U.S. in 1902 by Amburson Hydraulic Construction Co. of Boston, which still held the patents on the techniques in 1909 (Schuyler, p. 465).

CONTINUE ON SEPARATE SHEET IF NECESSARY

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Baltimore Gas and Electric News, "Improvements at Ilchester", Vol. 5,
No. 4, pp. 157-160

CONTINUE ON SEPARATE SHEET IF NECESSARY

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY _____

Electrical World, Vol. L, #5, pp. 207-210. August 3, 1907

VERBAL BOUNDARY DESCRIPTION

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE

COUNTY

STATE

COUNTY

11 FORM PREPARED BY

NAME / TITLE

John Hnedak, Historic Sites Survey Team Captain

ORGANIZATION

DATE

Maryland Historical Trust

1978-79

STREET & NUMBER

TELEPHONE

21 State Circle

269-2438

CITY OR TOWN

STATE

Annapolis

Maryland 21401

The Maryland Historic Sites Inventory was officially created by an Act of the Maryland Legislature, to be found in the Annotated Code of Maryland, Article 41, Section 181 KA, 1974 Supplement.

The Survey and Inventory are being prepared for information and record purposes only and do not constitute any infringement of individual property rights.

RETURN TO: Maryland Historical Trust
The Shaw House, 21 State Circle
Annapolis, Maryland 21401
(301) 267-1438

Electric World
August 2, 1907

BLOEDE'S DAM
(PATAPSCO DAM)

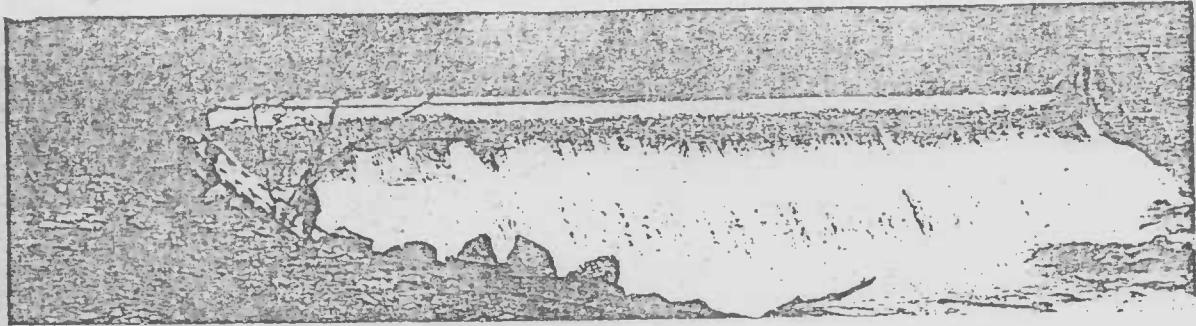


FIG. 1.—DAM ACROSS THE PATAPSCO RIVER NEAR ILCHESTER, MD., WITHIN WHICH THE POWER PLANT IS PLACED.

Power Plant Inside of a Dam on the Patapsco River.

THE Patapsco Electric & Manufacturing Company, of Ellicott City, Md., has lately completed its new dam and power house on the Patapsco River near Ilchester, some 15 miles or more below Baltimore on the Washington Branch of the Baltimore & Ohio Railroad. The plant is unique in that it is placed within the dam and is thus completely under water. The plant also has the distinction of being the first of its kind ever built, and the cost is of course very much less than

dam. The spillway is 168 ft. long and is provided with anchor bolts so that if at any time it may be deemed desirable, flash boards may be bolted to them and the available head increased two feet. The back water extends $\frac{3}{4}$ of a mile with an average width of about 300 feet to the tail waters of a cotton mill located at Ilchester. The dam is built of reinforced concrete and the "deck" is supported by 19 buttresses 24 ins. thick at the bottom and 16 ins. thick at the top, which are placed 12 ft. apart. The mixture used was 1 : 3 : 6. The edges of the buttresses and of the openings are reinforced with $\frac{3}{4}$ -in. corrugated iron rods in groups of three. The shell of the dam is 18 ins.

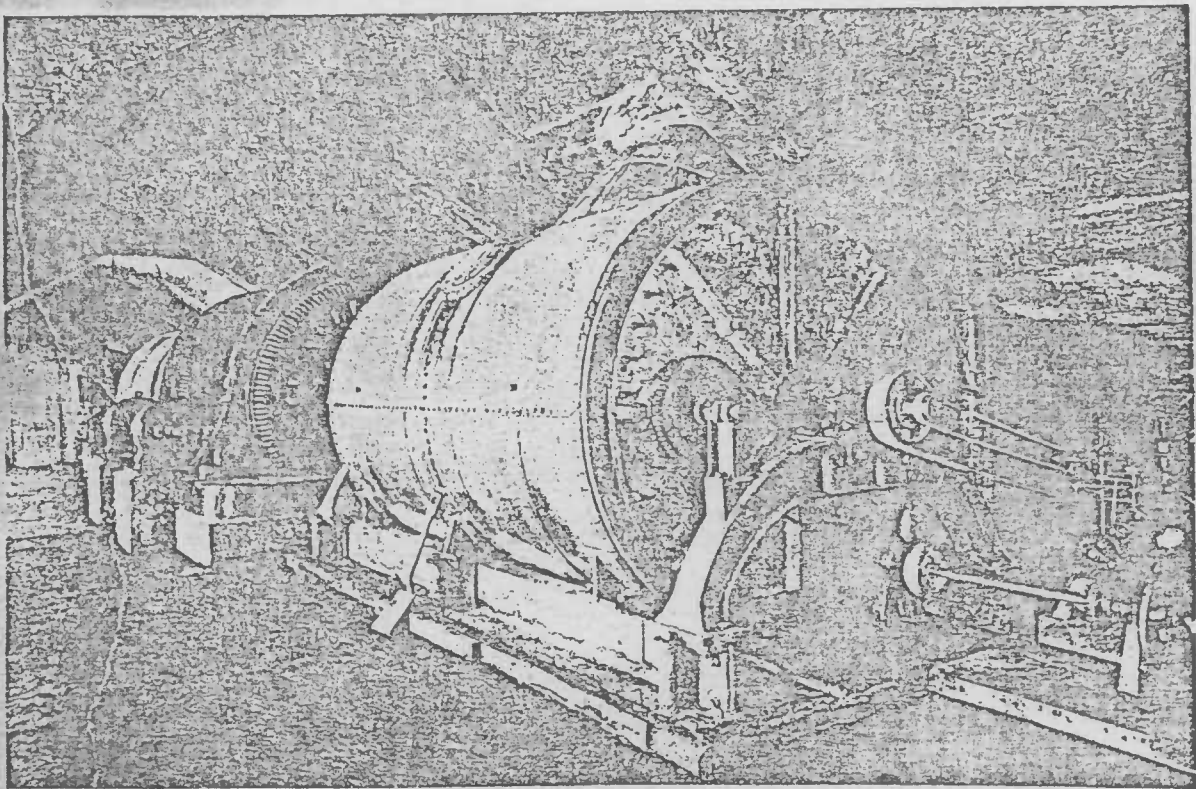


FIG. 2.—INTERIOR VIEW OF THE DAM, SHOWING THE ELECTRICAL GENERATING APPARATUS INSTALLED.

that of any other arrangement. A view of the dam within which the power plant is placed is shown in Fig. 1.

THE DAM.

The dam has a total length of 220 ft. and is 40 ft. wide at the base. The height of the dam from normal tail water to the crest is 26½ ft. At each end the buttresses and deck of the dam rise 10 ft. above the spillway as a protection from floods and to afford convenient entrances to the interior of the

dam. The spillway is 168 ft. long and is provided with anchor bolts so that if at any time it may be deemed desirable, flash boards may be bolted to them and the available head increased two feet. The back water extends $\frac{3}{4}$ of a mile with an average width of about 300 feet to the tail waters of a cotton mill located at Ilchester. The dam is built of reinforced concrete and the "deck" is supported by 19 buttresses 24 ins. thick at the bottom and 16 ins. thick at the top, which are placed 12 ft. apart. The mixture used was 1 : 3 : 6. The edges of the buttresses and of the openings are reinforced with $\frac{3}{4}$ -in. corrugated iron rods in groups of three. The shell of the dam is 18 ins.

tion is all that could be desired; while during rainy weather, at which time the water is muddy, the illumination is not quite so good. The view of the interior of the power house shows

Space has been provided for an additional unit of the same capacity. Each alternator is provided with a 125-volt exciter

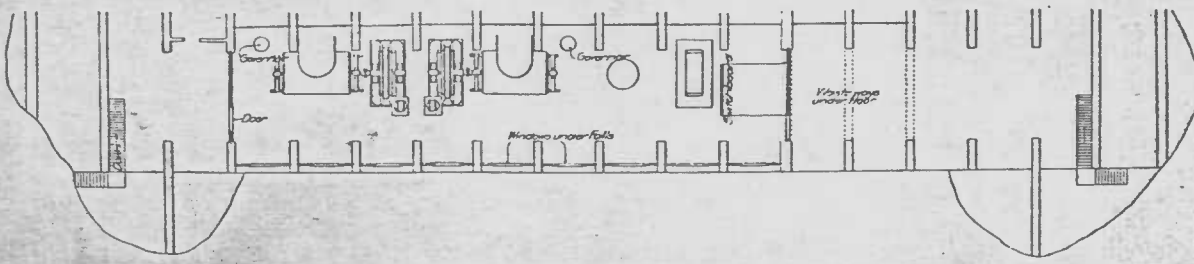


FIG. 3.—PLAN VIEW OF DAM, SHOWING LAY-OUT OF MACHINERY.

how much light is received through the windows beneath the falls.

At present only 108 feet of the dam is used for housing the power plant. This part of the dam is fitted with a false ceiling hung five feet from the inside of the dam so as to protect the apparatus from any water that might seep through the outer shell of the dam. The dam is built of a fine and rich mixture which was laid very wet. Aside from this no precautions were taken to eliminate water. The ceiling slopes until it reaches the

belted to the shaft. The part of the dam used as a power house is 108 ft. long, 10 ft. high and 27 ft. wide except at the buttresses where the width is 18 ft. The arrangement of the machinery is well shown in the engravings and in the plan and cross-sectional elevation of the dam. A concrete-steel floor is placed at a proper elevation above the lower pool between buttresses, the latter being increased in section below the floor. The hollow interior structure is built upon this floor, as indicated in Fig. 4.

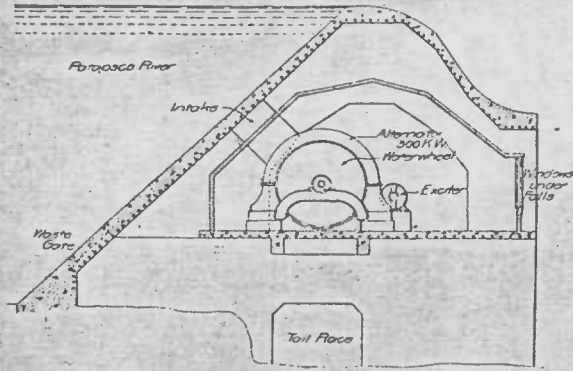


FIG. 4.—CROSS-SECTIONAL ELEVATION OF DAM.

The water is fed to the turbines through steel pipes passing through the up-stream spillway shell and discharged by draft tubes into the base of the dam, dropping into a well sunk some three feet below the river bed. The water passes thence by way of a channel constructed in the river bed, out of the dam. The intake is 5½ ft. below the crest of the spillway so that the trash racks are kept clear of drift wood, etc. The trash rack is 10½ ft., and the flumes to the turbines 7 ft. in diameter. Two waste gates are placed near the bottom of the dam, the water from these passing under the floor. The flow through the feed pipe is controlled by a valve operated from the turbine chamber.

The mechanism for operating this valve is shown to the right in Fig 2. The advantages of such an arrangement of water-wheel and generator are readily discerned. The dam foundation and structure are the power-house; the chamber is free from moisture by reason of the free circulation of air around it and the development utilizes all the available fall.

vertical sides forming the power house. That portion of the dam not protected with the false ceiling is comparatively dry as very little water percolates through. What little water finds its way through the concrete trickles along the under side to the drain at the bottom. Were it not for this moisture a person within the power house would not be conscious that he was beneath the water. The waste water going over the crest of the dam is carried on the apron of the spillway to within 16 ft. of the tail water. This apron causes the water to fall about 20 ft. from the down-stream side of the dam and as the river bed is quite rocky at this point, no appreciable pitting takes place.

A fish ladder is placed at one side of the dam as required by law. This is 125 ft. long and has the proper slope and fins so that fish can easily go from the tail water to that above the dam. The wooden trough is shown at the entrance to one side of the dam. It might be well to state in passing that the reason for insisting on fish ways in dams is that when the fish spawn they go up stream to the head waters. To reach the waters above the dam they jump from fin to fin of the fish ladder until they reach the top.

POWER PLANT.

The power plant equipment consists of two 34-in. horizontal, Leffel water-wheels fitted with Woodward governors arranged so that either governor may control both wheels when the generators are operated in parallel. Each turbine runs at a speed of 240 r. p. m. and is direct-connected to an Allis-Chalmers 300-kw, 11,000-volt, three-phase, 60-cycle alternator.

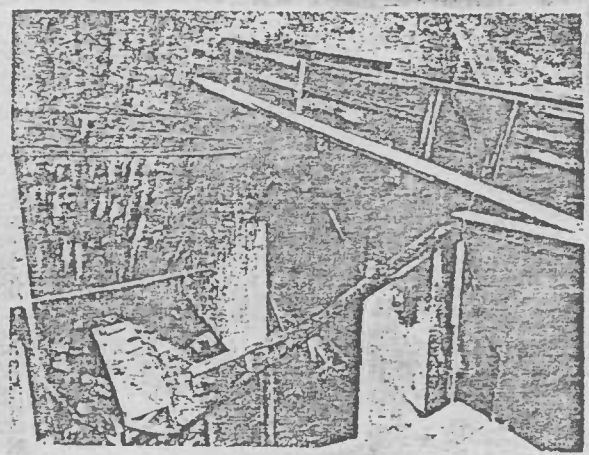


FIG. 5.—ENTRANCE TO POWER HOUSE, SHOWING FISH LADDER PASSING THROUGH.

The entire electrical installation is compact, secure, and of the highest efficiency so far as it can be obtained from flow and fall. It will be appreciated that the water falls directly through the top of the dam into and through the wheels below, thus avoiding the friction and other losses of power resulting from carrying the water through long race ways to the wheels.

The difference between the present system and those already in vogue may be likened to direct-driven and belt-driven machinery. The actual saving in power or what amounts to the same thing, the greater efficiency of the water will be approximately equal to the difference between belt and direct-drive.



FIG. 6.—SIDE VIEW OF DAM, SHOWING THE THROW OF THE WATER FROM APRON.

The switchboard, which is located at one end of the power house, was built by the General Electric Company and is fitted with instruments, as shown in Fig. 9. As the exciters are arranged to be operated in multiple an automatic regulator is used for controlling the voltage of the generators. Polyphase indicating wattmeters have been provided: one for indicating

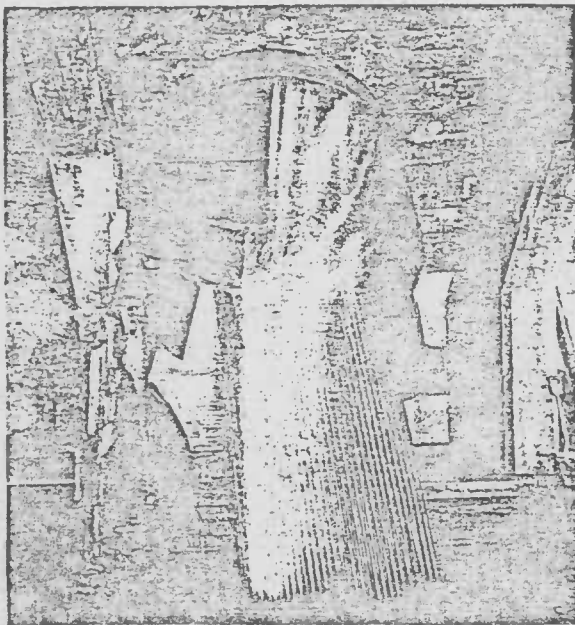


FIG. 7.—INTAKE FOR ADDITIONAL UNIT, SHOWING SUBMERGED RACKS IN THE UP-STREAM SIDE OF DAM.

the street service and the other the total load. A polyphase curve-drawing wattmeter is also used for recording the total output of the station.

The leads to the generators and for the commercial and street feeders are fitted with distant control, oil circuit-breakers, with disconnecting switches. The circuit-breakers for the gen-

erators have time-limit relays so that in case of trouble on the outside feeders, they will not open before the others. The switchboard is arranged so that there is no danger of shock to the operator at the board. The voltage at the board does not exceed 125 volts, as the circuit-breakers, disconnecting

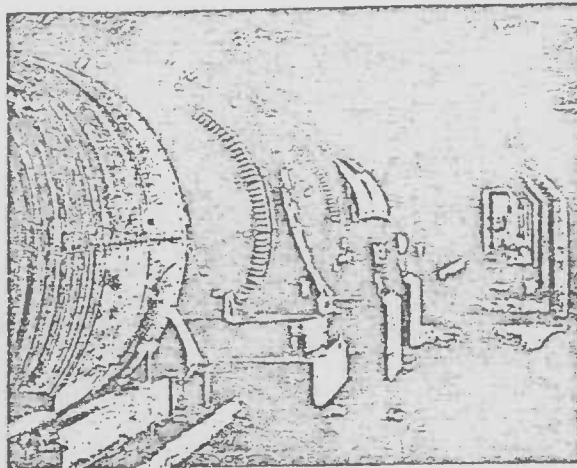


FIG. 8.—INTERIOR OF DAM, SHOWING LIGHT RECEIVED THROUGH WINDOWS UNDER THE FALLS.

switches, high-tension bus-bars, transformers, etc., are placed about eight feet from the front of the board with plenty of room for persons to make the necessary repairs without danger of coming in contact with high-voltage apparatus. The transmission lines cover such a large territory, that it was decided to use 11,000 volt alternators in place of stepping up the potential by means of transformers.

When the plant is completed it will supply electricity for both lamps and motors. At present Ellicott City, Catonsville, Irvington, Carroll, Halethorp, Arbutus, St. Denis, Elkridge and a part of West Baltimore are being supplied from the plant near Grays Mills. The territory covered is about six by ten miles and there is a considerable day load for that section of the country, about 250 horse-power. It is intended to extend the lines to West Arlington and Mount Washington, a distance of about 14 miles, when the new plant is delivering electricity. The old plant near Grays Mills has a capacity of 680 horse-power of which 380 horse-power is generated by water. The

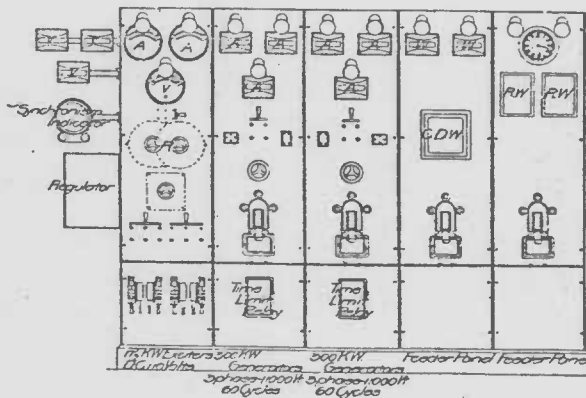


FIG. 9.—ELEVATION OF SWITCHBOARD.

electrical apparatus at this plant consists of one 240-kw Stanley generator and one 150-kw Allis-Chalmers generator. Both generators are wound for 2200-volts, two-phase, 60-cycles and transformers are used to step the potential up to 11,000 volts. At Catonsville, Wilkins Avenue and Beachfield Road, Wilkins Avenue and Roland Road and at the city limits transformers

are located for reducing the potential for distribution circuits. These are 2200-volt, single-phase lines except near the city limits, where, because of large motors installed, three-phase current is used. After the new station is in operation, it is the intention to use the old power house as a sub-station, as it is from this station that the different lines radiate.

Mr. Victor G. Bloede is president and general manager of the company and Mr. Otto Wonder is its superintendent. The designer and builder of the dam was the Ambursen Hydraulic Construction Company, of Boston, and H. von Schon, of Detroit, Mich., was the consulting hydraulic engineer. Messrs. Newton and Painter, of Baltimore, were the electrical engineers. The submerged power house was in this case the only feasible method of development on account of the available location and limitations of cost. A dam of this height is said to be the smallest that is available for a power house of this construction. At heights of from 40 ft. upwards details of submerged power houses, it is claimed, can be worked out to advantage and without the difficulty of restricted space.

Decorative Lighting in Philadelphia During the Elks' Carnival.

The annual reunion of the Elks, held in Philadelphia during the week July 15-20, was the occasion for what was probably the most elaborate civic electrical display ever made in this

display of a public and progressive spirit which has rarely been equaled upon occasions of this sort. The display of bunting, flags, emblems and other daylight effects was most elaborate and costly. The main business streets and many of the streets in the outlying districts were fairly ablaze with color, but overtopping all else was the lavish electrical display—a display which attracted scores of thousands of people to the business district every night during the week. It was an example of the efficacy, the compelling power of electrical advertising, without which no business street in a large city can ever hope to obtain its full share of trade.

It may be of interest to know just what method was pursued by the Philadelphia Electric Company to do its share toward working up public interest, in making an electrical display which resulted in such a notable exhibit. Many weeks prior to the convention the solicitors of the company were started out upon the labor of interesting its customers, particularly the retail stores and the large department stores, in the matter of individual electrical display. This work was preliminary, the idea being merely to arouse interest and not to close contracts at that time.

Three weeks prior to the convention, the columns of the daily newspapers of Philadelphia were used for a specially prepared series of advertisements bearing directly upon Elks' week. This series is reproduced elsewhere in this issue. The copy used aimed to arouse civic pride and enthusiasm in the influx of several hundred thousand visitors and the necessity

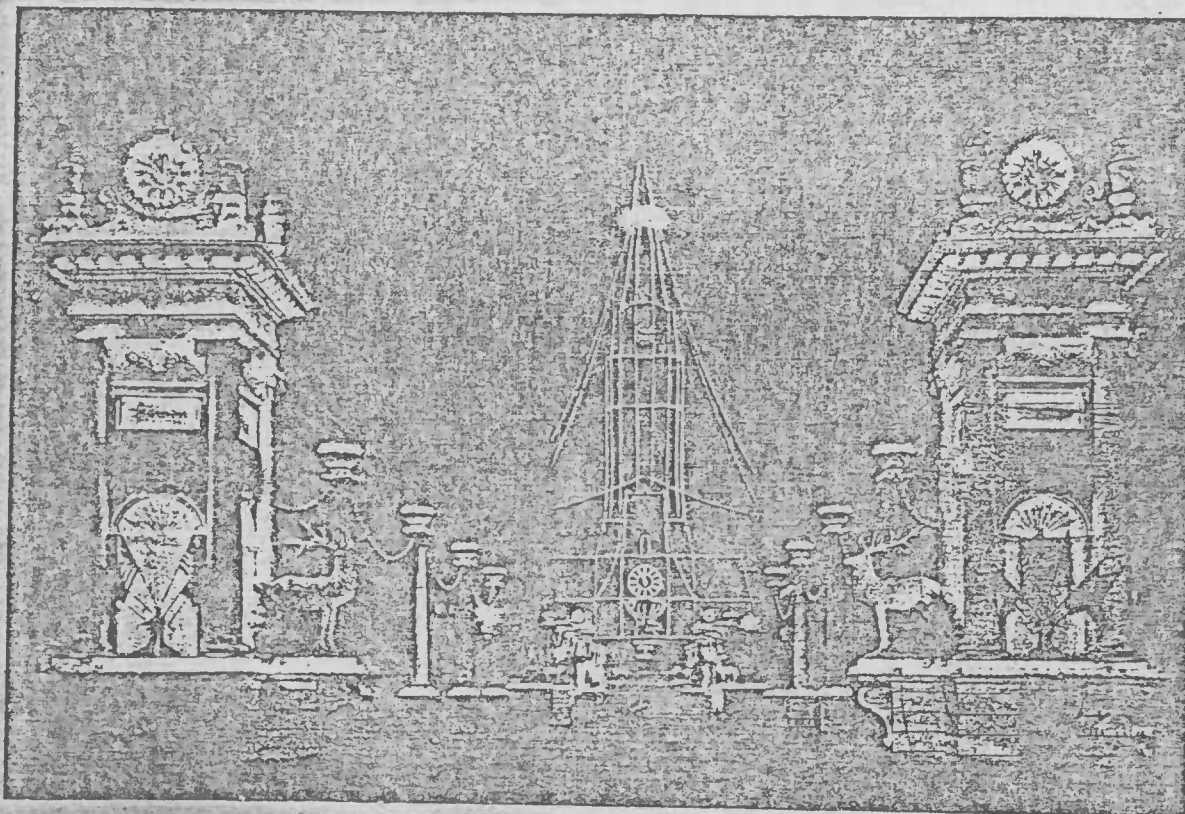


FIG. 1.—COURT OF HONOR ON NORTH BROAD STREET, LOOKING TOWARDS THE CITY HALL.

country, excluding, of course, world's fairs and similar exhibitions.

The response of Philadelphia merchants to the solicitations of the Elks' special convention committee, the advertising and solicitation of the Philadelphia Electric Company, and the general all-around booming and hurrah of the Philadelphia newspapers was beyond all expectation. Philadelphia arose to the opportunity of self-advertising, and at the same time gave a

for advertising Philadelphia as well as its business houses by elaborate preparations in the decorative line, and calling attention to the fact that the electrical way was the only effective way.

The interest of the newspapers was obtained and they inserted frequent notes regarding the proposed electrical features of the convention. As a result, some days before the convention, it was impossible to obtain any more electrical devices

SAVAGE QUADRANGLE
MARYLAND
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 LAUREL 15' QUADRANGLE

5662 1 SW
(BALTIMORE WEST)

MI. TO U.S. 29
CITY) 344

345 47'30"

346

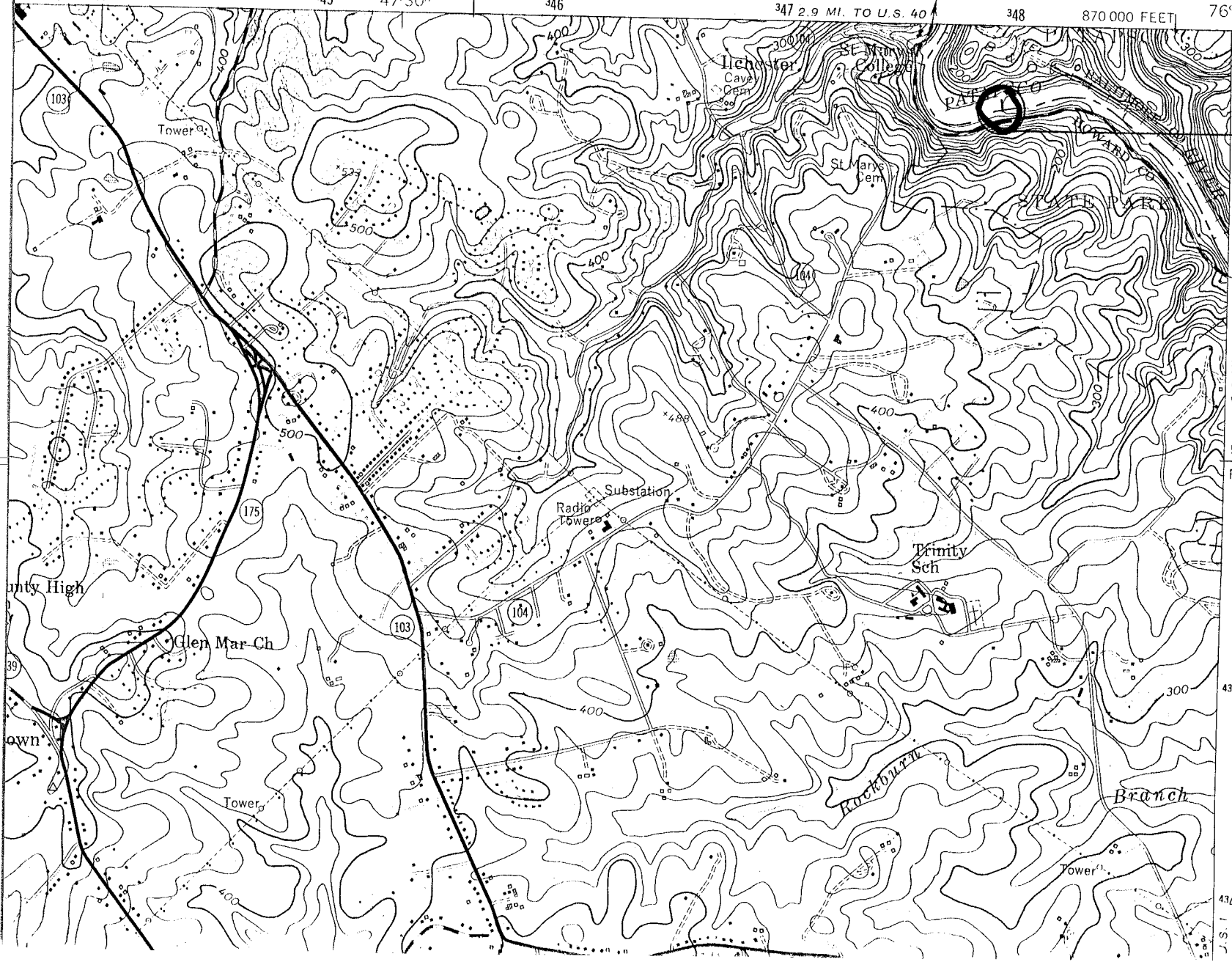
347 2.9 MI. TO U.S. 40

348

870 000 FEET

76°45'

39°15'



BLOEDE'S DAM
BA-1581

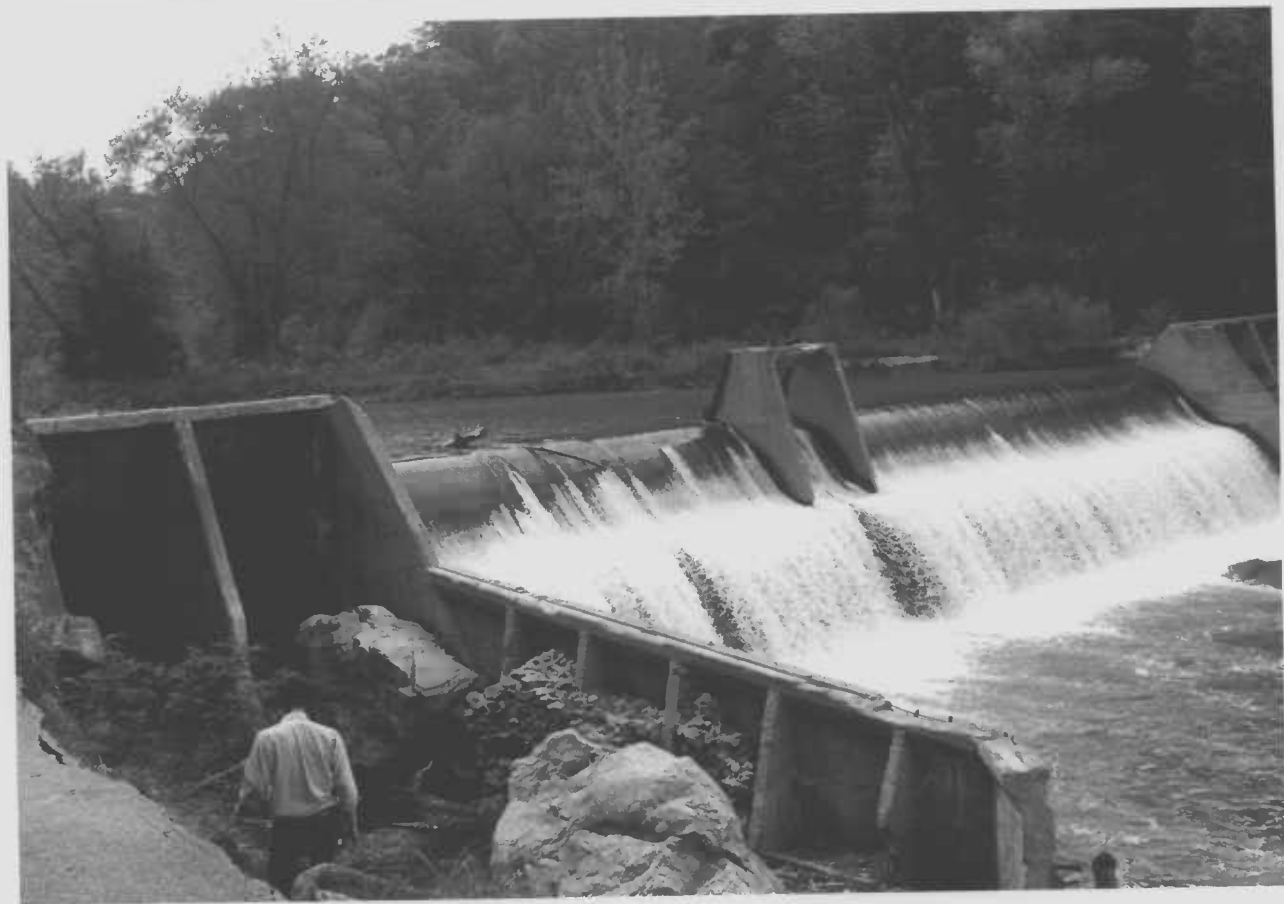
4345

2.8 MI. TO U.S. 1

510 000
FEET

4343

4342



BA-1587